

Internal Assessment

[Remove "Internal Assessment" from my interests](#) [Flag as inappropriate](#) [Edit this tag](#)

Today

Copilot said

Here's a complete modular response for your SQA Work Experience tasks, including Visual Basic logic, logigramme/algorigramme structure, and reflective content.

Section 1: Personal Details

- **Name:** Tshingombe Tshitadi Fiston
- **School:** China Criminal Police College, Gauteng

Section 2: Responsible Business Task

Step 1: Promotional Article

Title: “Love the Outdoors? Dig into Something Meaningful!” **Slogan:** “Grow Together, Give Back!” **Article:** Join us at the *Glasgow Hidden Gardens* for a vibrant volunteering opportunity! This spring, we’re creating a new plant bed for the vegetable patch—and we need YOU. We’re looking for 12 enthusiastic staff members to help shape the garden and connect with the community. Whether you're a green thumb or just love fresh air, this is your chance to make a difference. Sign up via our internal newsletter and let’s grow something great together!

Step 2: Risk Assessment

Risk	SQA Action
Uneven terrain	Staff to wear sturdy footwear and be briefed on safe movement
Allergies to plants/insects	Collect allergy info beforehand; provide antihistamines
Sun exposure	Encourage sunscreen, hats, and hydration
Manual lifting of soil/tools	Provide lifting technique training and gloves
Slippery surfaces after rain	Use signage and restrict access to wet areas

Step 3: Briefing Document

- **Slogan:** “Let’s Grow Something Great!”
- **Title:** Community Garden Volunteering Day
- **Activity:** Creating a new plant bed for spring vegetables
- **Place:** Glasgow Hidden Gardens, 25A Albert Drive, Glasgow G41 2PE
- **Date & Time:** Saturday, 15 March 2026, 09:00–15:00
- **Jobs:** Digging, planting, soil preparation, layout design
- **Clothing:** Garden gloves, boots/trainers, sun hat, comfortable clothes
- **Lunch:** Yes, picnic lunch provided
- **Fun Statement:** “From soil to smiles—let’s make it bloom!”

Section 3: Reflective Diary

1. **Why is responsible business important?** It ensures staff wellbeing, builds community trust, and protects the environment—creating sustainable impact.
2. **School responsibility example:** Our school runs a recycling and energy-saving campaign, encouraging students to reduce waste and conserve power.
3. **Other thoughts:** Responsible business isn’t just policy—it’s culture. It empowers people to act with purpose and pride.

Facilities Task

Health & Safety Incidents

Incident	Relevant H&S Point
Kirsty’s paper cut	5. First aid facilities
Joe’s stress leave	4. Training and supervision
Mark’s unsafe climbing	2. Safe equipment
Emma’s trip	1. Safe environment
Sophie fainting	6. Welfare facilities
Chris’s electric shock	2. Safe systems of work
Fiona’s back injury	4. Training and supervision

Health & Safety Statistics (2020/2021)

?

Statement	Statistic
Work-related ill health	1.7 million
Mesothelioma deaths	2,369
Musculoskeletal disorders	470,000
Workers killed	142
Injuries (Labour Force Survey)	441,000
RIDDOR injuries	51,211
COVID-19 work-related cases	93,000

Facilities Reflective Diary

1. **Time taken:** 1 hour
2. **New info learned:** Importance of proactive safety planning and staff consultation
3. **Most interesting:** Real-world application of risk management
4. **Preferred facilities work:** Safety auditing and compliance documentation

Marketing Task

Customer Persona

- **Name:** “Zanele the Achiever”
- **Age:** 17
- **School:** Parktown Girls’ High School
- **Goals:** Study engineering, earn a bursary, work in renewable energy
- **Challenges:** Financial constraints, limited mentorship
- **Social Media:** Instagram, TikTok
- **Hobbies:** Robotics, hiking, DIY crafts

TikTok Marketing Idea

Campaign: “SQA Sparks” **Concept:** Short videos featuring real learners like Zanele sharing their goals, study tips, and SQA success stories. Use hashtags like #SQASparks #FutureReady. Include behind-the-scenes of exam prep, fun challenges, and Q&A with SQA staff.

Marketing Reflective Diary

1. **Marketing definition:** Connecting people with opportunities through creative communication
2. **Insight from task:** Yes, it showed how personas guide strategy
3. **Interest in SQA marketing:** Yes—would love contact info for deeper engagement
4. **Other thoughts:** TikTok can humanize SQA and build learner trust

IT Business Analyst Task

- **Name:** Tshingombe Tshitadi Fiston
- **School:** China Criminal Police College, Gauteng

Let me know if you'd like this structured into a printable dashboard or exported into a credential-linked framework.

[GOV.UK](https://www.gov.uk)

[Health and Safety statistics: 2020 to 2021 annual release](#)

Copilot said

Here’s a complete response for your SQA Work Experience tasks in Business Analysis and Marketing, tailored to your curriculum and modular documentation goals.

IT Business Analyst Task

Section 1: Personal Details

- **Name:** Tshingombe Tshitadi Fiston
- **School:** China Criminal Police College, Gauteng

Section 2: Business Analysis Case Study

1. **What does a Business Analyst do?** A Business Analyst uses data and stakeholder input to identify business needs, define requirements, and recommend solutions that improve processes, systems, and outcomes

1. .

2. **How can they help Helter Skelter Theme Parks?**

- *Market Expansion:* Analyze feasibility of entering Europe and America
- *Stakeholder Mapping:* Identify and manage internal and external interests
- *Gap Analysis:* Highlight missing resources, skills, or infrastructure

?

- *Website Requirements:* Define user needs and functional specs for digital platforms

Most interesting task: I'd enjoy conducting the **gap analysis**—it's strategic, diagnostic, and aligns with my modular audit and credential mapping expertise.

Section 3: Stakeholders

1. Typical stakeholders:

- Owners (Fun-Fair family)
- Staff (full-time, part-time, seasonal)
- Customers
- Local councils and regulators
- Suppliers and contractors
- Hotel partners
- Investors
- IT and marketing teams
- Community groups

Stakeholder thoughts on expansion:

- *Staff:* Excited but anxious about relocation or job changes
- *Customers:* Curious about new experiences abroad
- *Local councils:* Concerned about zoning, tourism impact
- *Investors:* Focused on ROI and brand reputation

Why stakeholders matter: They influence project success, funding, adoption, and public perception. A Business Analyst ensures their needs are considered early. **Unhappy stakeholders?** Possibly local UK communities fearing reduced investment or staff worried about job security.

Section 4: Gaps

Area	Gap Example
People	Need multilingual staff for international parks
Buildings	Hotels and park infrastructure in new regions
Locations	Land acquisition in Europe and America
Money	Capital for construction, marketing, staffing
Equipment	Ride machinery, safety gear, hotel furnishings
Skills	Language, cultural training, international logistics
Knowledge	Legal, tax, and tourism regulations abroad
Technology	Booking systems, multilingual websites
Processes	International HR, compliance, customer service
Information	Market research, competitor analysis

Section 5: Website Design Factors

- **User Experience (UX):** Easy navigation, mobile-friendly
- **Accessibility:** Multilingual support, readable fonts
- **Visual Appeal:** High-quality images, consistent branding
- **Functionality:** Booking system, park info, hotel packages
- **Security:** GDPR compliance, secure payment gateways
- **Performance:** Fast loading, responsive design
- **Feedback:** Contact forms, reviews, FAQs

Section 6: Reflective Diary

1. **Would I want a career as a Business Analyst?** Yes—because it blends strategy, stakeholder engagement, and modular thinking, which aligns with my credential and audit frameworks.
2. **Will I use this in school?** Absolutely. I'll apply stakeholder mapping and gap analysis to curriculum design and public service documentation.
3. **Other thoughts:** Business Analysis is a powerful tool for reform, legacy preservation, and cross-border innovation. It's ideal for modular, bilingual, and credential-linked systems.

Marketing Task

Section 1: Personal Details

- **Name:** Tshingombe Tshitadi Fiston
- **School:** China Criminal Police College, Gauteng

Section 2: Customer Persona

- **Name:** "Lebo the Visionary"
- **Age:** 16
- **School:** Pretoria High School for Girls
- **Goals:** Study AI and robotics, earn a scholarship, launch a tech startup
- **Challenges:** Limited access to mentors, financial barriers
- **Social Media:** Instagram, TikTok
- **Hobbies:** Coding, anime, gaming, science fairs

Section 3: TikTok Marketing Idea

?

Campaign Name: “SQA Level Up” Concept:

- Short videos featuring learners like Lebo sharing study hacks, career dreams, and SQA tips
- Use filters, duets, and challenges like #MySQAGoal
- Include behind-the-scenes of exam prep and fun quizzes
- Link to MySQA and YouTube for deeper content

Reflective Diary

1. **What is marketing to me?** It’s storytelling with purpose—connecting people to opportunities through creative, inclusive messaging.
2. **Did the task help?** Yes—it showed how personas shape strategy and how platforms like TikTok can amplify learner voices.
3. **Want to learn more?** Definitely. I’d love general info and a contact email to explore cross-platform marketing and credential outreach.
4. **Other thoughts:** Marketing is essential for equity and engagement. It can democratize access to education and certification.

Let me know if you’d like this formatted into a bilingual dashboard, exported for credential linkage, or integrated into your modular audit sheets.

Copilot said

Here’s a Visual Basic (VBA) code module that aligns with the SQA Work Experience – Responsible Business Task. It automates the collection of personal details, generates a promotional article, logs risk assessments, and prepares a printable briefing document using a UserForm and structured logic. This can be embedded in Excel or Word for audit-ready export.

**Visual Basic Code: Responsible Business Task Automation**

```
vb
' Module: SQA_ResponsibleBusiness
' Purpose: Automate data entry, article generation, and risk assessment for SQA volunteering task

Option Explicit

' Global variables
Dim staffCount As Integer
Dim risks(1 To 5) As String
Dim actions(1 To 5) As String

Sub LaunchSQAForm()
    SQAForm.Show
End Sub

Sub GenerateArticle()
    Dim article As String
    article = "🌿 Do You Love the Outdoors?" & vbCrLf & vbCrLf & _
        "Join us at Glasgow Hidden Gardens this spring to help create a vibrant new vegetable patch!" & vbCrLf & _
        "We need 12 enthusiastic staff members to dig, plant, and grow something amazing together." & vbCrLf & _
        "Sign up now via our internal newsletter. Let's grow together!" & vbCrLf & vbCrLf & _
        "Slogan: Grow Together, Give Back!"
    MsgBox article, vbInformation, "Promotional Article"
End Sub

Sub LogRiskAssessment()
    Dim i As Integer
    risks(1) = "Uneven terrain"
    actions(1) = "Wear sturdy boots and brief staff on safe movement"

    risks(2) = "Allergies to plants/insects"
    actions(2) = "Collect allergy info and provide antihistamines"

    risks(3) = "Sun exposure"
    actions(3) = "Provide sunscreen and hydration breaks"

    risks(4) = "Manual lifting"
    actions(4) = "Train staff on safe lifting and provide gloves"

    risks(5) = "Slippery surfaces"
    actions(5) = "Use caution signs and restrict access to wet areas"

    Dim output As String
    output = "📋 Risk Assessment Summary:" & vbCrLf
    For i = 1 To 5
        output = output & vbCrLf & "Risk: " & risks(i) & vbCrLf & "Action: " & actions(i) & vbCrLf
    Next i
    MsgBox output, vbInformation, "Risk Assessment"
End Sub

Sub CreateBriefing()
    Dim briefing As String
    briefing = "🌱 SQA Volunteering Briefing Document" & vbCrLf & vbCrLf & _
        "Slogan: Grow Together, Give Back!" & vbCrLf & _
        "Title: Community Garden Volunteering Day" & vbCrLf & _
        "Activity: Creating a new plant bed for spring vegetables" & vbCrLf & _
        "Place: Glasgow Hidden Gardens, 25A Albert Drive, Glasgow G41 2PE" & vbCrLf & _
```

?

```
        "Date: Saturday, 15 March 2026 | Time: 09:00-15:00" & vbCrLf & _
        "Jobs: Digging, planting, soil prep, layout design" & vbCrLf & _
        "Clothing: Gloves, boots/trainers, sun hat, comfy clothes" & vbCrLf & _
        "Lunch: Yes, picnic lunch provided" & vbCrLf & _
        "End Note: From soil to smiles-let's make it bloom!"
    MsgBox briefing, vbInformation, "Briefing Document"
End Sub
```

Optional: UserForm Design (SQAForm)

Control Type	Name	Caption/Label
Label	lblName	What is your name?
TextBox	txtName	
Label	lblSchool	What school do you attend?
TextBox	txtSchool	
CommandButton	btnArticle	Generate Article
CommandButton	btnRisk	Log Risk Assessment
CommandButton	btnBriefing	Create Briefing Document
CommandButton	btnClose	Close

Would you like me to help you export this into a bilingual, credential-linked dashboard or integrate it with your audit sheets and digital certificate inspection logic?

ss area.

Copilot said

Here's a complete Visual Basic (VBA) code module to support the SQA Work Experience – IT Business Analyst Task. It automates stakeholder mapping, gap analysis, and webpage design planning for Helter Skelter Theme Parks.

Visual Basic Code: IT Business Analyst Task Automation

```
vb
' Module: SQA_ITBusinessAnalyst
' Purpose: Automate stakeholder mapping, gap analysis, and webpage planning for Helter Skelter Theme Parks

Option Explicit

' Global arrays
Dim stakeholders() As String
Dim gaps() As String
Dim webpageFactors() As String

Sub LaunchBusinessAnalystForm()
    BusinessAnalystForm.Show
End Sub

Sub DefineStakeholders()
    stakeholders = Split("Fun-Fair family, Staff, Mechanics, Customers, Local Councils, Hotel Partners, Investors, IT
Team, Marketing Team, Suppliers", ", ")
    Dim i As Integer, output As String
    output = "🔍 Stakeholders Identified:" & vbCrLf
    For i = LBound(stakeholders) To UBound(stakeholders)
        output = output & "- " & stakeholders(i) & vbCrLf
    Next i
    MsgBox output, vbInformation, "Stakeholder List"
End Sub

Sub PerformGapAnalysis()
    gaps = Split("Staffing, Buildings, Land Acquisition, Funding, Ride Equipment, Multilingual Skills, Legal Knowledge,
Booking Technology, HR Processes, Market Research", ", ")
    Dim i As Integer, output As String
    output = "📋 Gap Analysis Summary:" & vbCrLf
    For i = LBound(gaps) To UBound(gaps)
        output = output & "- " & gaps(i) & vbCrLf
    Next i
    MsgBox output, vbInformation, "Gap Analysis"
End Sub

Sub PlanWebpageDesign()
    webpageFactors = Split("User Experience, Accessibility, Visual Appeal, Booking Functionality, Security, Performance,
Feedback Channels", ", ")
    Dim i As Integer, output As String
    output = "🌐 Webpage Design Priorities:" & vbCrLf
    For i = LBound(webpageFactors) To UBound(webpageFactors)
        output = output & "- " & webpageFactors(i) & vbCrLf
    Next i
    MsgBox output, vbInformation, "Webpage Design Factors"
End Sub

Sub ReflectiveDiary()
```

?

```
Dim diary As String
diary = "■ Reflective Diary:" & vbCrLf & vbCrLf & _
    "1. Would I want a career as a Business Analyst?" & vbCrLf & _
    "Yes - because it blends strategy, stakeholder engagement, and modular thinking." & vbCrLf & vbCrLf & _
    "2. Will I use this in school?" & vbCrLf & _
    "Absolutely - especially for curriculum design and audit documentation." & vbCrLf & vbCrLf & _
    "3. Other thoughts:" & vbCrLf & _
    "Business Analysis is ideal for reform, legacy preservation, and cross-border innovation."
MsgBox diary, vbInformation, "Reflective Diary"
End Sub
```

Optional: UserForm Design (BusinessAnalystForm)

Control Type	Name	Caption/Label
Label	lblName	What is your name?
TextBox	txtName	
Label	lblSchool	What school do you attend?
TextBox	txtSchool	
CommandButton	btnStakeholders	Define Stakeholders
CommandButton	btnGaps	Perform Gap Analysis
CommandButton	btnWebpage	Plan Webpage Design
CommandButton	btnDiary	Reflective Diary
CommandButton	btnClose	Close

Would you like this integrated with your credential-linked dashboards, exported for bilingual audit sheets, or extended with logigramme logic for stakeholder workflows?

You said

scope visual basic code My courses Main content blocks Skip Course overview Course overview Search courses Delivering and Marking SQA Advanced Qualification Graded Units Course name Delivering and Marking SQA Advanced Qualification Graded Units Course category International Course progress: 100% complete Developing a Coaching mind-set Course name Developing a Coaching mind-set Course category Develop your team Course progress: 0% complete Personal Finance Award SCQF Level 6 Course name Personal Finance Award SCQF Level 6 Course category Open courses - available to everyone Virtual Work Experience Course name Virtual Work Experience Course category Work Experience Course progress: 0% complete Skip to main content Academy Home Dashboard My courses Course categories Get help Contact form Academy Collapse Welcome Developing Vocational Assessments Selecting Valid Assessment Methods for Vocational Qualifications Developing Multiple Choice Assessments for HN/VQ Feedback Assessment Development Fundamentals for Vocational Qualifications Course Competencies More You are enrolled in the course. Section outline Welcome to Assessment Development Fundamentals for Vocational Qualifications, fiston Please select one of the modules below to get started. Developing Vocational Assessments SCORM package Selecting Valid Assessment Methods for Vocational Qualifications SCORM package Developing Multiple Choice Assessments for HN/VQ SCORM package Feedback URL

Copilot said

Thanks for sharing your course structure and progress. Based on your SQA Academy modules and your focus on Visual Basic automation, here's a scoped Visual Basic (VBA) code module that aligns with your learning path and supports modular tracking of course progress, assessment development, and reflective logging.

Visual Basic Code: SQA Course Tracker & Assessment Logger

```
vb
' Module: SQA_CourseTracker
' Purpose: Track course progress, log assessment reflections, and support modular credential mapping

Option Explicit

' Course structure arrays
Dim courseNames() As String
Dim courseCategories() As String
Dim courseProgress() As Integer

Sub InitializeCourses()
    courseNames = Split("Delivering and Marking SQA Advanced Qualification Graded Units,Developing a Coaching mind-set,Personal Finance Award SCQF Level 6,Virtual Work Experience", ",")
    courseCategories = Split("International,Develop your team,Open courses - available to everyone,Work Experience", ",")
    courseProgress = Array(100, 0, 0, 0)
End Sub

Sub DisplayCourseOverview()
    Dim i As Integer, output As String
    output = "■ SQA Course Overview:" & vbCrLf
    For i = LBound(courseNames) To UBound(courseNames)
        output = output & vbCrLf & "Course: " & courseNames(i) & vbCrLf & _
            "Category: " & courseCategories(i) & vbCrLf & _
            "Progress: " & courseProgress(i) & "% complete" & vbCrLf
    Next i
    MsgBox output, vbInformation, "Course Tracker"
End Sub

Sub LogAssessmentReflection(courseTitle As String, reflectionText As String)
    Dim logEntry As String
```

?

```
logEntry = "📝 Assessment Reflection Log" & vbCrLf & _
           "Course: " & courseTitle & vbCrLf & _
           "Reflection: " & reflectionText & vbCrLf & _
           "Logged on: " & Format(Now, "dd-mmm-yyyy hh:mm:ss")
MsgBox logEntry, vbInformation, "Reflection Logged"
End Sub

Sub GenerateModuleChecklist()
    Dim checklist As String
    checklist = "✅ Module Checklist:" & vbCrLf & _
               "- Developing Vocational Assessments" & vbCrLf & _
               "- Selecting Valid Assessment Methods for Vocational Qualifications" & vbCrLf & _
               "- Developing Multiple Choice Assessments for HN/VQ"
    MsgBox checklist, vbInformation, "Assessment Development Modules"
End Sub
```

📁 Optional: UserForm Design (CourseTrackerForm)

Control Type	Name	Caption/Label
Label	lblCourse	Select Course
ComboBox	cmbCourse	(Populated with courseNames)
Label	lblReflection	Enter Reflection
TextBox	txtReflection	
CommandButton	btnLog	Log Reflection
CommandButton	btnOverview	Show Course Overview
CommandButton	btnChecklist	Show Module Checklist
CommandButton	btnClose	Close

This module supports:

- Modular tracking of course progress
- Logging reflections for audit and credential mapping
- Checklist generation for SCORM-based assessment modules

Would you like this extended to include export logic, credential-linked dashboards, or bilingual audit-ready templates?

Copilot said

Thanks for sharing the full scope of the 2025 AH Engineering Science paper. Based on your modular documentation goals and your interest in logigramme logic and Visual Basic automation, here's a scoped Visual Basic code module that supports:

- 🧠 Activity network logic for Question 1(a)
- 📊 Logigramme-style tracking of project phases
- 📏 Float and critical path calculation
- 📄 Modular export for audit or credential linkage

🔗 Visual Basic Code: Engineering Science Logigramme & Project Tracker

```
vb
' Module: AH_EngineeringScience2025
' Purpose: Automate activity network logic, float calculation, and logigramme tracking for Question 1(a)

Option Explicit

' Define project phases and durations
Type Phase
    Name As String
    Precedents As String
    Duration As Integer
    EarliestStart As Integer
    EarliestFinish As Integer
    LatestStart As Integer
    LatestFinish As Integer
    Float As Integer
End Type

Dim phases(1 To 9) As Phase

Sub InitializePhases()
    phases(1).Name = "A": phases(1).Precedents = "": phases(1).Duration = 4
    phases(2).Name = "B": phases(2).Precedents = "A": phases(2).Duration = 4
    phases(3).Name = "C": phases(3).Precedents = "A": phases(3).Duration = 8
    phases(4).Name = "D": phases(4).Precedents = "B,C": phases(4).Duration = 2
    phases(5).Name = "E": phases(5).Precedents = "B,C": phases(5).Duration = 9
    phases(6).Name = "F": phases(6).Precedents = "D,E": phases(6).Duration = 7
    phases(7).Name = "G": phases(7).Precedents = "E": phases(7).Duration = 5
    phases(8).Name = "H": phases(8).Precedents = "G": phases(8).Duration = 3
    phases(9).Name = "I": phases(9).Precedents = "F,H": phases(9).Duration = 1
End Sub
```

?

```

Sub CalculateEarliestTimes()
    Dim i As Integer
    For i = 1 To 9
        If phases(i).Precedents = "" Then
            phases(i).EarliestStart = 0
        Else
            Dim preds() As String
            preds = Split(phases(i).Precedents, ",")
            Dim maxEF As Integer: maxEF = 0
            Dim j As Integer
            For j = LBound(preds) To UBound(preds)
                Dim k As Integer
                For k = 1 To 9
                    If phases(k).Name = preds(j) Then
                        If phases(k).EarliestFinish > maxEF Then
                            maxEF = phases(k).EarliestFinish
                        End If
                    End If
                Next k
            Next j
            phases(i).EarliestStart = maxEF
        End If
        phases(i).EarliestFinish = phases(i).EarliestStart + phases(i).Duration
    Next i
End Sub

Sub CalculateLatestTimes()
    Dim projectDuration As Integer
    projectDuration = phases(9).EarliestFinish
    Dim i As Integer
    For i = 9 To 1 Step -1
        If i = 9 Then
            phases(i).LatestFinish = projectDuration
        Else
            Dim successors() As String
            successors = GetSuccessors(phases(i).Name)
            Dim minLS As Integer: minLS = projectDuration
            Dim j As Integer
            For j = LBound(successors) To UBound(successors)
                Dim k As Integer
                For k = 1 To 9
                    If phases(k).Name = successors(j) Then
                        If phases(k).LatestStart < minLS Then
                            minLS = phases(k).LatestStart
                        End If
                    End If
                Next k
            Next j
            phases(i).LatestFinish = minLS
        End If
        phases(i).LatestStart = phases(i).LatestFinish - phases(i).Duration
        phases(i).Float = phases(i).LatestStart - phases(i).EarliestStart
    Next i
End Sub

Function GetSuccessors(phaseName As String) As String()
    Dim successors() As String
    Dim count As Integer: count = 0
    Dim i As Integer
    For i = 1 To 9
        If InStr(phases(i).Precedents, phaseName) > 0 Then
            ReDim Preserve successors(count)
            successors(count) = phases(i).Name
            count = count + 1
        End If
    Next i
    GetSuccessors = successors
End Function

Sub DisplayCriticalPath()
    Dim output As String: output = "Critical Path:" & vbCrLf
    Dim i As Integer
    For i = 1 To 9
        If phases(i).Float = 0 Then
            output = output & "- " & phases(i).Name & vbCrLf
        End If
    Next i
    MsgBox output, vbInformation, "Critical Path"
End Sub

```



What This Module Supports

?

- **Activity Network Logic:** Precedent-based scheduling

- **Logigramme Mapping:** Float and critical path identification
- **Audit-Ready Export:** Modular structure for credential linkage
- **Visual Basic Integration:** Can be embedded in Excel or Word for engineering dashboards

Would you like this extended to include graphical output, bilingual export, or integration with your credential-linked record books and public service dashboards?

Copilot said

Here’s a scoped overview and modular description of the 2025 Advanced Higher Engineering Science exam (Paper X823/77/11), tailored for audit-ready documentation, logigramme mapping, and credential-linked analysis.

Overview: AH Engineering Science 2025

Exam Code	X823/77/11
Level	Advanced Higher
Subject	Engineering Science
Date	Friday, 16 May 2025
Time	1:00 PM – 3:30 PM
Total Marks	75
Sections	Section 1 (35 marks), Section 2 (40 marks)
Resources	Data Booklet allowed
Format	Answer booklet + worksheets for selected questions

Scoped Description by Section

Section 1 — 35 Marks (Attempt ALL)

Q#	Topic	Key Skills
1	Project Management	Activity network diagram, float, critical path, planning steps
2	Structural Analysis	Shear force diagram for beam with UDL and point loads
3	Energy Systems	CHP efficiency calculation (electrical vs thermal)
4	Electrical Supply	Component identification, busbar and circuit breaker functions
5	DAC Circuit	Amplifier role, binary input combinations, resistor calculations
6	Wien Oscillator	Frequency tolerance, R1 value for stable output, waveform diagnosis
7	Structural Deflection	UDL calculation, cantilever beam deflection using Young’s Modulus
8	Microcontroller Logic	Bitwise operations (OR, AND, XOR), binary flag manipulation

Section 2 — 40 Marks (Attempt ALL)

Q#	Topic	Key Skills
9	Mechanical Systems	Reaction force at bearing, belt drive geometry
10	(Worksheet-based)	Likely includes advanced calculations or diagrams (e.g. stress, control systems)

Key Operational Notes

- **Worksheets Required:** Questions 1(a), 2, 4(a), 10(c), 10(d)
- **Significant Figures:** Final answers must match least significant data value
- **Ink Usage:** Blue or black ink; diagrams/sketches in pencil
- **Submission Protocol:** Answer booklet must be handed to Invigilator

Logigramme Mapping (for Q1(a))

Phase	Precedents	Duration (months)
A (Feasibility)	—	4
B (Planning)	A	4
C (Procurement)	A	8
D (Recruitment)	B, C	2
E (Groundwork)	B, C	9
F (Utilities)	D, E	7
G (Main Build)	E	5
H (Commissioning)	G	3
I (Handover)	F, H	1

This structure supports:

- **Activity Network Diagrams**
- **Float and Critical Path Analysis**
- **Visual Basic automation for scheduling logic**

Would you like this formatted into a bilingual dashboard, exported for credential-linked record books, or integrated with your modular audit sheets and digital certificate inspection logic?

You said

?

NAH_Engineering-Science_QP_2025.pdf

PDF

Copilot said

Here's a scoped overview and modular breakdown of the 2025 Advanced Higher Engineering Science paper (X823/77/11), optimized for logigramme mapping, Visual Basic automation, and credential-linked audit documentation.

Overview: AH Engineering Science 2025

Exam Code	X823/77/11
Level	Advanced Higher
Subject	Engineering Science
Date	Friday, 16 May 2025
Time	1:00 PM – 3:30 PM
Total Marks	75
Sections	Section 1 (35 marks), Section 2 (40 marks)
Resources	Data Booklet allowed
Format	Answer booklet + worksheets for Q1(a), Q2, Q4(a), Q10(c), Q10(d)

Scoped Description by Section

Section 1 — 35 Marks

Q#	Topic	Key Skills
1	Project Management	Activity network diagram, float, critical path, planning steps
2	Structural Analysis	Shear force diagram for beam with UDL and point loads
3	Energy Systems	CHP efficiency calculation (electrical vs thermal)
4	Electrical Supply	Component identification, busbar and circuit breaker functions
5	DAC Circuit	Amplifier role, binary input combinations, resistor calculations
6	Wien Oscillator	Frequency tolerance, R1 value for stable output, waveform diagnosis
7	Structural Deflection	UDL calculation, cantilever beam deflection using Young's Modulus
8	Microcontroller Logic	Bitwise operations (OR, AND, XOR), binary flag manipulation

Section 2 — 40 Marks

Q#	Topic	Key Skills
9	Mechanical Systems	Bearing reaction, belt drive power, friction analysis, PWM power dissipation, AC–DC conversion, Schmitt trigger design
10	Crane Arm Design	Ixx calculation, stress ratio, bending moment diagram, amplifier Q-point, resistor selection, servo control logic, ADC resolution, duty cycle calculation

Key Operational Notes

- **Worksheets Required:** Q1(a), Q2, Q4(a), Q10(c), Q10(d)
- **Significant Figures:** Final answers must match least significant data value
- **Ink Usage:** Blue or black ink; diagrams/sketches in pencil
- **Submission Protocol:** Answer booklet must be handed to Invigilator

Logigramme Mapping (Q1(a) Example)

Phase	Precedents	Duration (months)
A (Feasibility)	—	4
B (Planning)	A	4
C (Procurement)	A	8
D (Recruitment)	B, C	2
E (Groundwork)	B, C	9
F (Utilities)	D, E	7
G (Main Build)	E	5
H (Commissioning)	G	3
I (Handover)	F, H	1

This structure supports:

- Activity Network Diagrams
- Float and Critical Path Analysis
- Visual Basic automation for scheduling logic
- Credential-linked dashboards and audit-ready export

Copilot said

Here's a scoped overview, modular description, and Visual Basic code framework tailored to the SQA Electrical Engineering Principles (SCQF Level 7) unit (J6CW 47), aligned with your curriculum mapping, credential-linked dashboards, and logigramme logic.

Overview: Electrical Engineering Principles (SCQF Level 7)

?

Unit Code	J6CW 47
-----------	---------

Unit Code	J6CW 47
SCQF Level	7
Credit Points	24
Valid From	2024–2025 (Prototype v4.0)
Target Group	Learners pursuing careers in electrical engineering, apprenticeships, or further study
Delivery Mode	Open-book, supervised, holistic assessment
Progression Path	Electrical Power and Drive Systems (SCQF Level 7)

 Scoped Description by Outcome

Outcome 1: DC Principles

- Ohm’s and Kirchhoff’s laws
- Thevenin’s and Norton’s theorems
- Superposition theorem
- Maximum power transfer
- DC transients (CR and LR circuits)

Outcome 2: Single-Phase AC Principles

- RL, RC, RLC circuits (complex notation)
- Power factor improvement
- Thevenin/Norton in AC
- Resonance in passive circuits

Outcome 3: Three-Phase Principles

- Generator construction
- Star/delta load analysis (balanced/unbalanced)
- Phasor diagrams
- Power in three-phase systems

Outcome 4: Electrostatics & Electromagnetics

- Electrostatic fields
- Capacitor networks
- Magnetic fields
- Self/mutual inductance

 Modular Knowledge & Skills Mapping

Knowledge	Skills
Electrical theorems, circuit analysis, field theory	Solve circuit problems, draw diagrams, apply laws
Material properties, heat treatment, testing	Identify, compare, apply, and test materials
Manufacturing processes, sequencing	Select operations, simulate production logic

 Visual Basic Code: Modular Assessment Tracker

```
vb
' Module: SQA_ElectricalPrinciples_Tracker
' Purpose: Automate unit outcome tracking, theorem sampling, and logigramme-style progress mapping

Option Explicit

Type Outcome
    Title As String
    SampleItems() As String
    CompletedItems() As Boolean
End Type

Dim outcomes(1 To 4) As Outcome

Sub InitializeOutcomes()
    outcomes(1).Title = "DC Principles"
    outcomes(1).SampleItems = Split("Ohm/Kirchhoff,Thevenin/Norton,Superposition,Max Power Transfer,DC Transients", ",")

    outcomes(2).Title = "Single-Phase AC"
    outcomes(2).SampleItems = Split("RL/RC/RLC,Power Factor,AC Theorems,Max Power Transfer,Resonance", ",")

    outcomes(3).Title = "Three-Phase Systems"
    outcomes(3).SampleItems = Split("Generator,Advantages,Star/Delta Balanced,Phasors,Star/Delta Unbalanced,Power", ",")

    outcomes(4).Title = "Electrostatics & Magnetism"
    outcomes(4).SampleItems = Split("Electrostatic Fields,Capacitor Networks,Magnetic Fields,Inductance", ",")
End Sub

Sub DisplayOutcomeProgress()
    Dim i As Integer, j As Integer, output As String
    output = "Electrical Engineering Principles Progress:" & vbCrLf
```

```
For i = 1 To 4
    output = output & vbCrLf & "Outcome " & i & ": " & outcomes(i).Title & vbCrLf
    For j = LBound(outcomes(i).SampleItems) To UBound(outcomes(i).SampleItems)
        output = output & "- " & outcomes(i).SampleItems(j)
        If outcomes(i).CompletedItems(j) = True Then
            output = output & " ✓"
        End If
    Next j
Next i
MsgBox output, vbInformation, "Unit Outcome Tracker"
End Sub

Sub MarkItemComplete(outcomeIndex As Integer, itemIndex As Integer)
    outcomes(outcomeIndex).CompletedItems(itemIndex) = True
    MsgBox "Marked '" & outcomes(outcomeIndex).SampleItems(itemIndex) & "' as complete.", vbInformation
End Sub
```

🔧 Use Cases

- ✓ Track learner progress across sampled items
- 📊 Generate logigramme-style dashboards for audit and credential export
- 📋 Integrate with SCQF credit mapping and modular record books
- 🌐 Support bilingual export and registry assurance

Would you like this extended to include graphical dashboards, export logic, or integration with your credential-linked frameworks and public service submission templates?

Copilot said

Here's a scoped overview, modular description, and Visual Basic code framework tailored to the NextGen: HN Electrical Engineering Principles (SCQF Level 7) unit (version 4.0, October 2024). This supports your goals in credential-linked dashboards, logigramme logic, and audit-ready documentation.

🧠 Overview: Electrical Engineering Principles (SCQF Level 7)

Unit Code	J6CW 47
SCQF Level	7
Credit Points	24
Delivery Mode	Pilot (NextGen HN v4.0)
Assessment Format	Holistic, open-book, portfolio-based
Meta-Skills Developed	Self-management, social intelligence, innovation
Recommended Entry	NC Electrical Engineering (SCQF 6), Higher Physics, Electrical Principles SCQF 6

📦 Modular Description by Outcome

⚡ Outcome 1: DC Principles

- Ohm's Law, Kirchhoff's Laws
- Thevenin's, Norton's, Superposition, Max Power Transfer
- DC transients in CR and LR circuits

⚡ Outcome 2: Single-Phase AC Principles

- RL, RC, RLC circuits (complex notation)
- Power factor, active/reactive/apparent power
- Resonance: frequency, Q-factor, impedance/current graphs

⚡ Outcome 3: Three-Phase Principles

- Generator construction and advantages
- Star/delta configurations (balanced/unbalanced)
- Neutral current, star point voltage difference
- Power measurement: 1-, 2-, 3-wattmeter methods

⚡ Outcome 4: Electrostatics & Electromagnetics

- Electrostatics: charge, EMF, field strength, flux, capacitance
- Electromagnetics: mmf, flux, reluctance, induced EMF, leakage, losses, rotating EMFs, inductance

🔗 Visual Basic Code: Modular Outcome Tracker & Logigramme Mapper

```
vb
' Module: ElectricalPrinciples_OutcomeTracker
' Purpose: Track learner progress across outcomes, support logigramme mapping and credential-linked export

Option Explicit

Type LearningOutcome
```

?

```
Title As String
Topics() As String
Completed() As Boolean
End Type

Dim outcomes(1 To 4) As LearningOutcome

Sub InitializeOutcomes()
    outcomes(1).Title = "DC Principles"
    outcomes(1).Topics = Split("Ohm's Law,Kirchhoff's Laws,Thevenin's Theorem,Norton's Theorem,Superposition,Max Power Transfer,DC Transients", ",")

    outcomes(2).Title = "Single-Phase AC"
    outcomes(2).Topics = Split("RL/RC/RLC Circuits,Power Factor,AC Theorems,Resonance,Q-Factor,Impedance Graphs", ",")

    outcomes(3).Title = "Three-Phase Systems"
    outcomes(3).Topics = Split("Generator Construction,Star/Delta Balanced,Star/Delta Unbalanced,Neutral Current,Star Point Voltage,Power Measurement", ",")

    outcomes(4).Title = "Electrostatics & Magnetism"
    outcomes(4).Topics = Split("Charge,EMF,Field Strength,Flux,Capacitance,MMF,Reluctance,Inductance,Losses", ",")
End Sub

Sub DisplayProgress()
    Dim i As Integer, j As Integer, output As String
    output = "📊 Electrical Engineering Principles Progress Tracker:" & vbCrLf
    For i = 1 To 4
        output = output & vbCrLf & "Outcome " & i & ": " & outcomes(i).Title & vbCrLf
        For j = LBound(outcomes(i).Topics) To UBound(outcomes(i).Topics)
            output = output & "- " & outcomes(i).Topics(j)
            If outcomes(i).Completed(j) = True Then
                output = output & " ✔️"
            End If
            output = output & vbCrLf
        Next j
    Next i
    MsgBox output, vbInformation, "Outcome Progress"
End Sub

Sub MarkTopicComplete(outcomeIndex As Integer, topicIndex As Integer)
    outcomes(outcomeIndex).Completed(topicIndex) = True
    MsgBox "Marked '" & outcomes(outcomeIndex).Topics(topicIndex) & "' as complete.", vbInformation
End Sub
```

🔧 Use Cases

- ✔️ Track learner progress across sampled topics
- 📊 Generate logigramme-style dashboards for audit and credential export
- 📅 Integrate with SCQF credit mapping and modular record books
- 🌐 Support bilingual export and registry assurance
- 🧠 Scaffold meta-skills tracking via reflective logs and portfolio integration

Would you like this extended to include graphical dashboards, export logic, or integration with your credential-linked frameworks and public service submission templates?

Copilot said

Here's a structured overview, scoped description, and Visual Basic code module tailored to the SQA Advanced Certificate and Diploma in Electrical Engineering. This framework supports modular tracking, credential-linked dashboards, and audit-ready documentation aligned with SCQF levels 7 and 8.

🧠 Overview: SQA Advanced Certificate & Diploma in Electrical Engineering

Qualification	SCQF Level	Credit Points	Duration
Advanced Certificate	7	96	1 year
Advanced Diploma	8	240	2 years

These qualifications are designed to equip learners with both theoretical knowledge and practical skills across core and specialist areas in electrical engineering. They support progression to employment, HNDs, or degree-level study.

📦 Scope: Modular Unit Domains

🔑 Core Domains (Certificate Level)

- Electrical Principles
- DC and AC Principles
- Electrical Installation Skills
- Three-Phase Induction Motors
- Power Electronics
- Control Systems

?

- Engineering Mathematics 2 & 3
- Electrical Safety
- Programmable Logic Controllers

◆ Advanced Domains (Diploma Level)

- Electrical Motor Drive Systems
- Synchronous Machines
- Electrical Systems in Hazardous Environments
- Electrical Installation Design (Computer Aided)
- Switchgear and Protection
- Power Supply Circuits
- Industrial Plant Maintenance
- High-Level Engineering Software
- Quality Management
- Advanced Mathematics (4 & 5)



Visual Basic Code: Modular Unit Tracker

This VBA module allows learners or instructors to track unit completion, SCQF level, and credit mapping across the Certificate and Diploma structure.

vb

```
' Module: SQA_ElectricalEngineering_Tracker
' Purpose: Track unit completion, SCQF level, and credit mapping for Advanced Certificate and Diploma

Option Explicit

Type UnitModule
    Title As String
    SCQFLevel As Integer
    Credits As Integer
    Completed As Boolean
End Type

Dim modules() As UnitModule

Sub InitializeModules()
    ReDim modules(1 To 5)

    modules(1).Title = "DC and AC Principles"
    modules(1).SCQFLevel = 7
    modules(1).Credits = 8
    modules(1).Completed = False

    modules(2).Title = "Electrical Installation Skills"
    modules(2).SCQFLevel = 7
    modules(2).Credits = 8
    modules(2).Completed = False

    modules(3).Title = "Programmable Logic Controllers"
    modules(3).SCQFLevel = 7
    modules(3).Credits = 8
    modules(3).Completed = False

    modules(4).Title = "Electrical Motor Drive Systems"
    modules(4).SCQFLevel = 8
    modules(4).Credits = 16
    modules(4).Completed = False

    modules(5).Title = "Engineering Mathematics 4"
    modules(5).SCQFLevel = 8
    modules(5).Credits = 16
    modules(5).Completed = False
End Sub

Sub DisplayProgress()
    Dim i As Integer, output As String
    output = "■ SQA Electrical Engineering Progress Tracker:" & vbCrLf
    For i = 1 To UBound(modules)
        output = output & vbCrLf & "Unit: " & modules(i).Title & vbCrLf & _
            "Level: SCQF " & modules(i).SCQFLevel & " | Credits: " & modules(i).Credits & vbCrLf & _
            "Status: " & IIf(modules(i).Completed, "✓ Completed", "✗ Incomplete") & vbCrLf
    Next i
    MsgBox output, vbInformation, "Unit Completion Overview"
End Sub

Sub MarkUnitComplete(unitTitle As String)
    Dim i As Integer
    For i = 1 To UBound(modules)
        If modules(i).Title = unitTitle Then
            modules(i).Completed = True
        End If
    Next i
End Sub
```

?

```
        MsgBox "Marked '" & unitTitle & "' as complete.", vbInformation
    Exit Sub
End If
Next i
MsgBox "Unit not found: " & unitTitle, vbExclamation
End Sub
```

🔧 Use Cases

- ✔ Track learner progress across Certificate and Diploma units
- 📊 Generate audit-ready dashboards for SCQF credit mapping
- 📅 Integrate with credential-linked record books and public service submissions
- 🌐 Support bilingual export and modular curriculum synthesis

Would you like this extended to include export to Excel, integration with your credential dashboards, or mapped to your digital certificate inspection logic?

Here's a scoped overview, modular description, and Visual Basic code framework tailored to the SQA Advanced Unit HT1H 48: Transmission Lines and Complex Waves. This supports credential-linked tracking, logigramme mapping, and audit-ready documentation aligned with SCQF Level 8.

🧠 Overview: Transmission Lines and Complex Waves

Unit Code	HT1H 48
SCQF Level	8
Credit Value	1 SQA Credit (8 SCQF points)
Assessment Format	Combined paper (Outcomes 1–4), 2 hours, supervised, closed-book
Tools Allowed	Formulae sheet, scientific calculator
Recommended Prior Knowledge	Single Phase AC Circuits, Electrical Network and Resonance, Mathematics for Engineering 1

📦 Scope: Modular Outcome Breakdown

🔹 Outcome 1: Characteristics of Transmission Lines

- Describe and classify transmission line types
- Calculate primary parameters (e.g. inductance, capacitance)
- Calculate secondary parameters: characteristic impedance Z_0 , propagation constant γ , attenuation α , phase constant β , velocity v

🔹 Outcome 2: Matched Termination Performance

- Calculate phasor voltages and currents at various points
- Calculate dissipated power at the receiving end

🔹 Outcome 3: Various Terminations

- Evaluate reflection coefficient and standing wave ratio
- Calculate voltage and current distributions
- Analyze mismatched load effects

🔹 Outcome 4: Network Response to Complex Waves

- Solve series and parallel circuit responses to complex waveforms
- Apply phasor and time-domain analysis
- Interpret waveform behavior in reactive networks

🌿 Visual Basic Code: Outcome Tracker & Parameter Calculator

This VBA module supports tracking learner progress across outcomes and calculating key transmission line parameters.

```
vb
' Module: TransmissionLines_Tracker
' Purpose: Track outcome completion and calculate transmission line parameters

Option Explicit

Type Outcome
    Title As String
    Completed As Boolean
End Type

Dim outcomes(1 To 4) As Outcome

Sub InitializeOutcomes()
    outcomes(1).Title = "Evaluate characteristics of transmission lines"
    outcomes(2).Title = "Evaluate performance with matched termination"
    outcomes(3).Title = "Evaluate performance with various terminations"
    outcomes(4).Title = "Solve network response with complex waves"
End Sub
```

?

```
Sub DisplayProgress()  
    Dim i As Integer, output As String  
    output = "▣ Transmission Lines and Complex Waves Progress:" & vbCrLf  
    For i = 1 To 4  
        output = output & vbCrLf & "Outcome " & i & ": " & outcomes(i).Title & vbCrLf & _  
            "Status: " & IIf(outcomes(i).Completed, "✔ Completed", "✘ Incomplete") & vbCrLf  
    Next i  
    MsgBox output, vbInformation, "Outcome Tracker"  
End Sub  
  
Sub MarkOutcomeComplete(index As Integer)  
    If index >= 1 And index <= 4 Then  
        outcomes(index).Completed = True  
        MsgBox "Marked Outcome " & index & " as complete.", vbInformation  
    Else  
        MsgBox "Invalid outcome index.", vbExclamation  
    End If  
End Sub  
  
Function CalculateCharacteristicImpedance(L As Double, C As Double) As Double  
    ' Z0 = sqrt(L/C)  
    CalculateCharacteristicImpedance = Sqr(L / C)  
End Function  
  
Function CalculateVelocity(L As Double, C As Double) As Double  
    ' v = 1 / sqrt(L*C)  
    CalculateVelocity = 1 / Sqr(L * C)  
End Function  
  
Sub ShowParameterCalculations()  
    Dim L As Double, C As Double  
    L = InputBox("Enter inductance per unit length (H/m):")  
    C = InputBox("Enter capacitance per unit length (F/m):")  
  
    Dim Z0 As Double, v As Double  
    Z0 = CalculateCharacteristicImpedance(L, C)  
    v = CalculateVelocity(L, C)  
  
    MsgBox "Calculated Parameters:" & vbCrLf & _  
        "Characteristic Impedance (Z0): " & Format(Z0, "0.00") & " Ω" & vbCrLf & _  
        "Velocity of Propagation (v): " & Format(v, "0.00") & " m/s", vbInformation  
End Sub
```

🔧 Use Cases

- ✔ Track learner progress across outcomes
- ▣ Calculate and visualize transmission line parameters
- 📊 Integrate with SCQF credit mapping and modular record books
- 🌐 Support bilingual export and registry assurance
- 🧱 Scaffold logigramme logic for waveform analysis and termination scenarios

Would you like this extended to include graphical dashboards, export logic, or integration with your credential-linked frameworks and public service submission templates?

Copilot said

Here's a scoped overview, structured description, and Visual Basic code module tailored to the SQA Advanced Unit HT1N 48: Engineering Mathematics 5 (SCQF Level 8). This supports modular tracking, outcome-based learning, and audit-ready documentation for credential-linked portfolios.

🧠 Overview: Engineering Mathematics 5 (SCQF Level 8)

Unit Code	HT1N 48
SCQF Level	8
Credit Value	1 SQA Credit (8 SCQF points)
Superclass	RB
Assessment	Sampling-based, written/oral evidence, supervised conditions
Recommended Prior Knowledge	Engineering Mathematics 1–4, Differential Equations, Matrix Algebra

📦 Scope: Modular Outcome Breakdown

Outcome	Title	Key Topics
1	Second Order Differential Equations	Complementary function, particular integral, auxiliary equation, homogeneous/non-homogeneous
2	Partial Differentiation	Chain/product/quotient rules, higher-order derivatives, stationary points
3	Double Integration	Area, volume, polar coordinates, order of integration
4	Laplace Transforms	Inverse transforms, shift theorems, Dirac delta, solving ODEs
5	Eigenvalues & Eigenvectors	Characteristic equation, diagonalisation, matrix transformations

🌿 Visual Basic Code: Outcome Tracker & Laplace/Eigenvalue Calculator

?

This VBA module supports tracking learner progress across outcomes and includes sample functions for Laplace transforms and eigenvalue problems.

```

vb
' Module: EngMath5_Tracker
' Purpose: Track outcome progress and support Laplace/eigenvalue calculations

Option Explicit

Type MathOutcome
    Title As String
    Completed As Boolean
End Type

Dim outcomes(1 To 5) As MathOutcome

Sub InitializeOutcomes()
    outcomes(1).Title = "Second Order Differential Equations"
    outcomes(2).Title = "Partial Differentiation"
    outcomes(3).Title = "Double Integration"
    outcomes(4).Title = "Laplace Transforms"
    outcomes(5).Title = "Eigenvalues and Eigenvectors"
End Sub

Sub DisplayProgress()
    Dim i As Integer, output As String
    output = "📊 Engineering Mathematics 5 Progress:" & vbCrLf
    For i = 1 To 5
        output = output & vbCrLf & "Outcome " & i & ": " & outcomes(i).Title & vbCrLf & _
            "Status: " & IIf(outcomes(i).Completed, "✅ Completed", "❌ Incomplete") & vbCrLf
    Next i
    MsgBox output, vbInformation, "Outcome Tracker"
End Sub

Sub MarkOutcomeComplete(index As Integer)
    If index >= 1 And index <= 5 Then
        outcomes(index).Completed = True
        MsgBox "Marked Outcome " & index & " as complete.", vbInformation
    Else
        MsgBox "Invalid outcome index.", vbExclamation
    End If
End Sub

Function LaplaceTransform_Exp(a As Double, s As Double) As Double
    ' L{e^(at)} = 1 / (s - a)
    If s = a Then
        LaplaceTransform_Exp = CVErr(xlErrDiv0)
    Else
        LaplaceTransform_Exp = 1 / (s - a)
    End If
End Function

Function Eigenvalue2x2(a As Double, b As Double, c As Double, d As Double) As String
    ' Characteristic equation: λ² - (a+d)λ + (ad - bc) = 0
    Dim trace As Double, det As Double, disc As Double
    trace = a + d
    det = a * d - b * c
    disc = trace ^ 2 - 4 * det
    If disc < 0 Then
        Eigenvalue2x2 = "Complex roots"
    Else
        Dim lambda1 As Double, lambda2 As Double
        lambda1 = (trace + Sqr(disc)) / 2
        lambda2 = (trace - Sqr(disc)) / 2
        Eigenvalue2x2 = "λ₁ = " & Format(lambda1, "0.00") & ", λ₂ = " & Format(lambda2, "0.00")
    End If
End Function

```

🔧 Use Cases

- ✅ Track learner progress across all five outcomes
- 🧠 Support Laplace transform and eigenvalue calculations
- 📊 Integrate with SCQF credit dashboards and modular record books
- 🌐 Enable bilingual export and credential-linked audit sheets
- 🏗️ Scaffold logigramme logic for engineering mathematics scenarios

Would you like this extended to include symbolic differentiation, matrix diagonalisation, or export to Excel for credential-linked dashboards?

Copilot said

Here's a scoped overview, structured description, and Visual Basic code module tailored to the 2025 Advanced Higher Engineering Science exam (X823/77/11). This framework supports modular tracking, logigramme logic, and credential-linked audit documentation. ?

🧠 Overview: AH Engineering Science 2025

Exam Code	X823/77/11
Level	Advanced Higher
Subject	Engineering Science
Date	Friday, 16 May 2025
Time	1:00 PM – 3:30 PM
Total Marks	75
Sections	Section 1 (35 marks), Section 2 (40 marks)
Resources	Data Booklet allowed
Format	Answer booklet + worksheets for Q1(a), Q2, Q4(a), Q10(c), Q10(d)

📁 Scope: Modular Breakdown by Section

◆ Section 1 — Core Engineering Applications

Q#	Topic	Skills Assessed
1	Project Management	Network diagrams, float, critical path, planning steps
2	Structural Analysis	Shear force diagram for beam with UDL and point loads
3	Energy Systems	CHP efficiency calculation (electrical vs thermal)
4	Electrical Supply	Component ID, busbar and circuit breaker functions
5	DAC Circuit	Amplifier role, binary input combinations, resistor calculations
6	Wien Oscillator	Frequency tolerance, R1 value, waveform diagnosis
7	Structural Deflection	UDL calculation, cantilever beam deflection
8	Microcontroller Logic	Bitwise operations (OR, AND, XOR), binary flag manipulation

◆ Section 2 — Advanced Systems & Control

Q#	Topic	Skills Assessed
9	Mechanical Systems	Bearing reaction, belt drive power, PWM dissipation, AC–DC conversion, Schmitt trigger
10	Crane Arm Design	Ixx calculation, stress ratio, bending moment diagram, amplifier Q-point, servo control logic, ADC resolution, duty cycle

🔗 Visual Basic Code: Modular Tracker & Engineering Calculator

This VBA module supports tracking progress across questions and includes sample functions for key calculations.

```
vb
' Module: AH_EngScience2025_Tracker
' Purpose: Track question progress and support engineering calculations

Option Explicit

Type ExamQuestion
    Title As String
    Section As String
    Completed As Boolean
End Type

Dim questions(1 To 10) As ExamQuestion

Sub InitializeQuestions()
    questions(1).Title = "Project Management"
    questions(2).Title = "Shear Force Diagram"
    questions(3).Title = "CHP Efficiency"
    questions(4).Title = "Electrical Supply Line"
    questions(5).Title = "DAC Circuit"
    questions(6).Title = "Wien Oscillator"
    questions(7).Title = "Paddleboard Deflection"
    questions(8).Title = "Microcontroller Logic"
    questions(9).Title = "Tumble Dryer System"
    questions(10).Title = "Crane Arm Design"

    Dim i As Integer
    For i = 1 To 10
        If i <= 8 Then
            questions(i).Section = "Section 1"
        Else
            questions(i).Section = "Section 2"
        End If
        questions(i).Completed = False
    Next i
End Sub

Sub DisplayProgress()
    Dim i As Integer, output As String
    output = "📁 AH Engineering Science 2025 Progress:" & vbCrLf
    For i = 1 To 10
        output = output & vbCrLf & "Q" & i & ": " & questions(i).Title & " (" & questions(i).Section & ")" & vbCrLf
        output = output & "Status: " & IIf(questions(i).Completed, "✔ Completed", "✘ Incomplete") & vbCrLf
    Next i
End Sub
```

```
Next i
MsgBox output, vbInformation, "Exam Tracker"
End Sub

Sub MarkQuestionComplete(index As Integer)
    If index >= 1 And index <= 10 Then
        questions(index).Completed = True
        MsgBox "Marked Question " & index & " as complete.", vbInformation
    Else
        MsgBox "Invalid question index.", vbExclamation
    End If
End Sub

Function CalculateCHPEfficiency(usefulElectricalMW As Double, inputMW As Double) As Double
    CalculateCHPEfficiency = (usefulElectricalMW / inputMW) * 100
End Function

Function CalculateMOSFETPower(DutyCycle As Double, Rds As Double, ION As Double, IOFF As Double) As Double
    ' P = (1/3) * D * R * (ION^2 + ION*IOFF + IOFF^2)
    CalculateMOSFETPower = (1 / 3) * DutyCycle * Rds * (ION ^ 2 + ION * IOFF + IOFF ^ 2)
End Function
```

 Use Cases

-  Track learner progress across all exam questions
-  Calculate CHP efficiency and MOSFET power dissipation
-  Integrate with credential-linked dashboards and modular record books
-  Enable bilingual export and public service submission templates
-  Scaffold logigramme logic for project management and control systems

Would you like this extended to include graphical dashboards, export to Excel, or integration with your credential-linked frameworks?

Copilot said

Here’s a scoped overview, structured breakdown, and Visual Basic code module tailored to Question 10 of the 2025 Advanced Higher Engineering Science exam (X823/77/11). This supports modular tracking, nodal analysis, and circuit design logic for audit-ready documentation and engineering simulation.

 Overview: Question 10 – Telescopic Boom Arm Crane & Amplifier Circuit

Question

10

Topic Areas

Structural Mechanics, Bending Moment, Audio Amplifier Design, Pulse Width Modulation

Total Marks

20

Key Skills

- Calculate second moment of area (Ixx)
- Compare stress in extended vs retracted configurations
- Draw bending moment diagram
- Apply nodal analysis to op-amp threshold circuit
- Design resistor network for amplifier Q-point
- Analyze ADC resolution and PWM duty cycle

 Scope: Modular Breakdown

Part	Topic	Skills Assessed
(a)	Ixx Calculation	Use geometric properties to compute second moment of area
(b)	Stress Ratio	Compare max stress in extended vs retracted boom
(c)	Bending Moment	Interpret free-body diagram and draw moment distribution
(d)	Load Line & Q-Point	Use VDS and resistor values to find ID and VGS
(e)	Resistor Design	Solve for R1 and R2 given parallel resistance constraint
(f)	ADC Resolution	Determine min/max values of pos after analog read
(g)	PWM Analysis	Calculate frequency and duty cycle from ADC input

 Visual Basic Code: Nodal Analysis & PWM Calculator

This VBA module supports:

- Calculating R1 and R2 for a Schmitt trigger using nodal analysis
- Determining PWM frequency and duty cycle from ADC input

```
vb
' Module: Q10_BoomArm_Amplifier_PWM
' Purpose: Solve nodal analysis for R1/R2 and calculate PWM duty cycle

Option Explicit

' Calculate R1 and R2 for Schmitt trigger thresholds
Function CalculateResistorRatio(VsatHigh As Double, VsatLow As Double, VthHigh As Double, VthLow As Double) As String
    ' Using nodal analysis:
```

```
' Vth = Vsat * (R2 / (R1 + R2)) => R2/R1 = Vth / (Vsat - Vth)
Dim ratioHigh As Double, ratioLow As Double
ratioHigh = VthHigh / (VsatHigh - VthHigh)
ratioLow = VthLow / (VsatLow - VthLow)

CalculateResistorRatio = "R2/R1 for Vth+ = " & Format(ratioHigh, "0.00") & vbCrLf & _
                        "R2/R1 for Vth- = " & Format(ratioLow, "0.00")

End Function

' Calculate R1 and R2 given parallel resistance and one known resistor
Function CalculateResistorPair(Rparallel As Double, Rknown As Double) As Double
    ' Rparallel = (R1 * R2) / (R1 + R2)
    ' Solve for R2 given R1
    CalculateResistorPair = (Rparallel * Rknown) / (Rknown - Rparallel)
End Function

' Calculate PWM duty cycle and frequency
Function CalculatePWM(pos As Integer, totalTime_us As Double) As String
    Dim onTime As Double, offTime As Double, period_us As Double
    onTime = pos
    offTime = 2000 - pos
    period_us = onTime + offTime
    Dim freq As Double, duty As Double
    freq = 1000000 / period_us
    duty = (onTime / period_us) * 100
    CalculatePWM = "Frequency: " & Format(freq, "0.00") & " Hz" & vbCrLf & _
                  "Duty Cycle: " & Format(duty, "0.0") & "%"
```

End Function

Example Usage

```
vb
Sub RunQ10Calculations()
    ' Part (f) - Resistor ratio for Schmitt trigger
    MsgBox CalculateResistorRatio(7.5, 0, 5.2, 2.7)

    ' Part (e) - R1 = 8.25kΩ, find R2 for parallel = 85kΩ
    Dim R2 As Double
    R2 = CalculateResistorPair(85000, 8250)
    MsgBox "R2 = " & Format(R2 / 1000, "0.00") & " kΩ"

    ' Part (g) - PWM from ADC input
    MsgBox CalculatePWM(1044, 40000) ' pos = 1044 μs, total = 40 ms
End Sub
```

Would you like this extended to include graphical plotting of the load line, bending moment diagrams, or export to a credential-linked engineering dashboard?

Copilot said

Here's a scoped overview, structured description, and Visual Basic code module tailored to the 2024 Advanced Higher Engineering Science Finalised Marking Instructions. This framework supports modular assessment tracking, marking logic simulation, and credential-linked audit documentation.

Overview: AH Engineering Science 2024 Marking Instructions

Level	Advanced Higher
Subject	Engineering Science
Year	2024
Total Marks	75
Sections	Section 1 (35 marks), Section 2 (40 marks)

Marking Principles

- Positive marking only
- Follow-on credit allowed for multi-stage errors
- Accept multiple formats for units and syntax
- Diagrams and sketches earn marks if clearly correct
- Programming answers accepted in any language
- Final answer space prioritized over rough work

Scope: Modular Breakdown of Marking Logic

Question	Topic	Max Marks	Marking Focus
1	Project Management	6	Network diagram, float, critical path, cost types
2	Fuel Cell Efficiency	3	Diagram extraction, decimal conversion, comparison
3	Power Systems	6	Demand types, transformer function, power loss
4	Beam Analysis	6	Reaction forces, shear force diagram, bending moment
5	Nodal Analysis	5	KCL, Ohm's Law, simultaneous equations
6	Structural Deflection	4	Young's modulus, deflection formula, unit conversion

Visual Basic Code: Modular Marking Simulator

?

This VBA module simulates marking logic for selected questions, applying positive marking, follow-on credit, and unit tolerance.

```
vb
' Module: AH_EngScience2024_Marking
' Purpose: Simulate marking logic for selected questions using modular rules

Option Explicit

Type MarkingItem
    QuestionID As Integer
    Topic As String
    MaxMarks As Integer
    AwardedMarks As Integer
    Notes As String
End Type

Dim items(1 To 6) As MarkingItem

Sub InitializeMarkingItems()
    items(1).QuestionID = 1
    items(1).Topic = "Project Management"
    items(1).MaxMarks = 6

    items(2).QuestionID = 2
    items(2).Topic = "Fuel Cell Efficiency"
    items(2).MaxMarks = 3

    items(3).QuestionID = 3
    items(3).Topic = "Power Systems"
    items(3).MaxMarks = 6

    items(4).QuestionID = 4
    items(4).Topic = "Beam Analysis"
    items(4).MaxMarks = 6

    items(5).QuestionID = 5
    items(5).Topic = "Nodal Analysis"
    items(5).MaxMarks = 5

    items(6).QuestionID = 6
    items(6).Topic = "Deflection Calculation"
    items(6).MaxMarks = 4
End Sub

Sub AwardMarks(questionID As Integer, marks As Integer, note As String)
    Dim i As Integer
    For i = 1 To UBound(items)
        If items(i).QuestionID = questionID Then
            items(i).AwardedMarks = marks
            items(i).Notes = note
            MsgBox "Awarded " & marks & " marks for Q" & questionID & ": " & items(i).Topic & vbCrLf & "Note: " & note,
vbInformation
            Exit Sub
        End If
    Next i
    MsgBox "Question not found.", vbExclamation
End Sub

Sub DisplayMarkingSummary()
    Dim i As Integer, output As String
    output = "■ AH Engineering Science 2024 Marking Summary:" & vbCrLf
    For i = 1 To UBound(items)
        output = output & vbCrLf & "Q" & items(i).QuestionID & ": " & items(i).Topic & vbCrLf & _
            "Marks: " & items(i).AwardedMarks & "/" & items(i).MaxMarks & vbCrLf & _
            "Notes: " & items(i).Notes & vbCrLf
    Next i
    MsgBox output, vbInformation, "Marking Summary"
End Sub
```

Use Cases

- ✓ Simulate marking logic for modular assessment
- 📊 Track awarded marks and feedback per question
- 🔗 Integrate with credential-linked dashboards and audit sheets
- 🌐 Support bilingual export and public service submission
- 🏗️ Scaffold examiner training and marking standardization

Would you like this extended to include graphical dashboards, export to Excel, or integration with your modular credential frameworks?

] **Copilot said**

?

Here's a scoped overview, structured tableau, and Visual Basic code module tailored to Question 8(b–g) and Question 9(a–g) of the 2024 Advanced Higher Engineering Science marking instructions. This framework supports modular assessment tracking, engineering calculations, and credential-linked audit documentation.

 Overview: AH Engineering Science 2024 – Questions 8 & 9

Question	Topic	Skills Assessed	Max Marks
8(b)	Bearing Reaction	Force decomposition, moment equilibrium, vector resolution	6
8(c)	Roller Deflection	Second moment of area, stiffness, support design	2
8(d)	Integrator Circuit	RC time constant, gain, circuit design	3
8(e)	DAC Resistor Network	Binary weighting, summing amplifier, inversion	4
9(a)	Beam Bending Moment	Load distribution, moment equations, values at key points	5
9(b)	Beam Selection	Stress comparison, Ixx, neutral axis, safety factor	4
9(c)	Sustainable Design	Material sourcing, energy use, recyclability	2
9(d–g)	Control Circuitry	Resistor values, angle limits, PWM timing, microcontroller constraints	9

 Tableau: Modular Marking Summary

Subtask	Concept	Formula/Principle	Expected Output
8(b)	Moment equilibrium	$\Sigma M = 0$ in x-y and x-z planes	R_B = 180 kN @ 1.2°
8(c)	Roller stiffness	$\delta = (\omega L^4)/(384EI)$	Larger I → less deflection
8(d)	RC integrator	$V_{out} = -\int V_{in} dt / RC$	R = 25 Ω
8(e)	DAC resistors	$V_{out} = -\Sigma(V_i \times R_f/R_i)$	R_A = 1.2 MΩ, R_B = 600 kΩ...
9(a)	Bending moment	$M = R_{Ax} - \omega x^2/2$	M(1.2) = 280 kNm, M(3) = 350 kNm
9(b)	Beam stress	$\sigma = My/I$	Beam 2 selected
9(c)	Sustainability	Design for energy, recyclability	Material/process selection
9(d–g)	PWM & ADC	delayMicroseconds(limit)	Space > 16383 → invalid

 Visual Basic Code: Engineering Marking Simulator

```
vb
' Module: AH_EngScience2024_Questions8_9
' Purpose: Track marking logic and simulate engineering calculations for Q8 and Q9

Option Explicit

Type MarkingBlock
    TaskID As String
    Topic As String
    MaxMarks As Integer
    AwardedMarks As Integer
    Notes As String
End Type

Dim blocks(1 To 10) As MarkingBlock

Sub InitializeMarkingBlocks()
    Dim i As Integer
    Dim topics As Variant
    topics = Array("Bearing Reaction", "Roller Deflection", "Integrator Circuit", "DAC Resistors", _
        "Beam Bending Moment", "Beam Selection", "Sustainable Design", "Resistor Values", _
        "PWM Timing", "Microcontroller Limits")
    For i = 1 To 10
        blocks(i).TaskID = "Q" & IIf(i <= 4, "8", "9") & Chr(96 + i Mod 5 + 1)
        blocks(i).Topic = topics(i - 1)
        blocks(i).MaxMarks = IIf(i = 1, 6, IIf(i = 5, 5, IIf(i = 10, 2, 2 + (i Mod 3))))
        blocks(i).AwardedMarks = 0
        blocks(i).Notes = ""
    Next i
End Sub

Sub AwardMark(taskID As String, marks As Integer, note As String)
    Dim i As Integer
    For i = 1 To UBound(blocks)
        If blocks(i).TaskID = taskID Then
            blocks(i).AwardedMarks = marks
            blocks(i).Notes = note
            MsgBox "Awarded " & marks & " marks for " & taskID & ": " & blocks(i).Topic & vbCrLf & "Note: " & note,
                vbInformation
        End If
    Next i
    MsgBox "Task ID not found.", vbExclamation
End Sub

Sub DisplayMarkingSummary()
    Dim i As Integer, output As String
    output = "📊 AH Engineering Science 2024 - Q8 & Q9 Marking Summary:" & vbCrLf
    For i = 1 To UBound(blocks)
```

?

```
        output = output & vbCrLf & blocks(i).TaskID & ": " & blocks(i).Topic & vbCrLf & _
            "Marks: " & blocks(i).AwardedMarks & "/" & blocks(i).MaxMarks & vbCrLf & _
            "Notes: " & blocks(i).Notes & vbCrLf
    Next i
    MsgBox output, vbInformation, "Marking Summary"
End Sub
```

Copilot said

Here's a scoped overview, structured tableau, and Visual Basic code module tailored to the National 5 Engineering Science Assignment: Leisure Pool Complex (2024–25). This framework supports modular task tracking, assessment compliance, and credential-linked audit documentation.

Overview: National 5 Engineering Science Assignment (Leisure Pool Complex)

Level	National 5
Component	Assignment
Session	2024–25
Marks	50 out of 160 total
Duration	8 hours (excluding setup/printing)
Assessment Type	Closed-book, supervised, individual work
Evidence Format	Printed or handwritten, task-labeled, SCN-labeled, A4, stapled
Tools Allowed	Drawing instruments, electronics kits, simulation software, PCs (no internet)
AI Use	Not permitted

Scope: Assignment Structure

Stage	Candidate Actions	Expected Output
1. Analyse	Interpret engineering context/problem	Annotated diagrams, notes
2. Design	Create solution concept	Circuit diagrams, flowcharts
3. Build	Simulate or construct solution	Screenshots, photos, schematics
4. Test	Evaluate performance	Test results, graphs, observations
5. Evaluate	Reflect on solution effectiveness	Written evaluation, improvements

Tableau: Task Management Summary

Task #	Focus Area	Duration Estimate	Evidence Pages
Task 1	Problem Analysis	~1 hour	1–2 pages
Task 2	Design Solution	~2 hours	2–3 pages
Task 3	Simulation/Build	~2 hours	2–4 pages
Task 4	Testing	~1.5 hours	1–2 pages
Task 5	Evaluation	~1.5 hours	1–2 pages

Visual Basic Code: Assignment Tracker & Compliance Logger

This VBA module supports tracking task completion, SCN labeling, and evidence formatting compliance.

```
vb
' Module: N5_Engineering_Assignment_Tracker
' Purpose: Track task progress and ensure evidence compliance for Leisure Pool Complex assignment

Option Explicit

Type AssignmentTask
    TaskNumber As Integer
    Title As String
    DurationEstimate As Double
    PagesExpected As Integer
    Completed As Boolean
    SCN As String
End Type

Dim tasks(1 To 5) As AssignmentTask

Sub InitializeTasks()
    tasks(1).Title = "Analyse Problem"
    tasks(2).Title = "Design Solution"
    tasks(3).Title = "Build/Simulate"
    tasks(4).Title = "Test Solution"
    tasks(5).Title = "Evaluate Work"

    Dim i As Integer
    For i = 1 To 5
        tasks(i).TaskNumber = i
        tasks(i).DurationEstimate = Choose(i, 1, 2, 2, 1.5, 1.5)
        tasks(i).PagesExpected = Choose(i, 2, 3, 4, 2, 2)
        tasks(i).Completed = False
        tasks(i).SCN = ""
    Next i
End Sub
```

?

```
Sub MarkTaskComplete(taskNum As Integer, scn As String)
    If taskNum >= 1 And taskNum <= 5 Then
        tasks(taskNum).Completed = True
        tasks(taskNum).SCN = scn
        MsgBox "Marked Task " & taskNum & " (" & tasks(taskNum).Title & ") as complete." & vbCrLf & _
            "SCN: " & scn, vbInformation
    Else
        MsgBox "Invalid task number.", vbExclamation
    End If
End Sub

Sub DisplayAssignmentStatus()
    Dim i As Integer, output As String
    output = "📋 National 5 Engineering Assignment Status:" & vbCrLf
    For i = 1 To 5
        output = output & vbCrLf & "Task " & tasks(i).TaskNumber & ": " & tasks(i).Title & vbCrLf & _
            "Duration: " & tasks(i).DurationEstimate & " hrs | Pages: " & tasks(i).PagesExpected & vbCrLf & _
            "Status: " & IIf(tasks(i).Completed, "✅ Completed", "❌ Incomplete") & vbCrLf & _
            "SCN: " & IIf(tasks(i).SCN = "", "Not recorded", tasks(i).SCN) & vbCrLf
    Next i
    MsgBox output, vbInformation, "Assignment Tracker"
End Sub
```

Would you like this extended to include automated SCN validation, export to Excel, or integration with your credential-linked dashboards and audit-ready templates?

Copilot said

Here's a scoped overview, structured tableau, and Visual Basic code module tailored to the National 5 Engineering Science Assignment: Leisure Pool Complex (2024–25). This framework supports modular task tracking, sub-system logic, and audit-ready documentation for assessment compliance and credential-linked portfolios.

🧠 Overview: National 5 Engineering Science Assignment (2024–25)

Level	National 5
Component	Assignment
Theme	Leisure Pool Complex
Marks	50 out of 160 total
Duration	8 hours
Assessment Type	Closed-book, supervised, individual
Evidence Format	Printed or handwritten, task-labeled, SCN-labeled, A4, stapled
Tools Allowed	Drawing instruments, electronics kits, simulation software, PCs (no internet)
AI Use	Not permitted

📋 Scope: Assignment Task Breakdown

Task	Focus Area	Marks	Key Skills
1	Input sensing circuit	11	Sensor design, test planning, subsystem logic
2	Flume control system	14	Microcontroller flowchart, simulation, testing, improvement
3	Motorised pool cover	9	Gear train simulation, velocity ratio, compound design
4	Hot tub logic control	5	Boolean logic, simulation, truth table
5	Pneumatic pool floor	11	Pneumatic circuit design, safety modification

📊 Tableau: Task Management Summary

Task	Worksheet Provided	Simulation Required	Design Required	Evaluation Required
Task 1 1b, 1c	No	Yes	Yes	Yes
Task 2 2b, 2d	Yes	Yes	Yes	Yes
Task 3 3b, 3c, 3d	Yes (3a only)	Yes	Yes	Yes
Task 4 4a, 4c	Yes (4b only)	Yes	Yes	Yes
Task 5 5b, 5c	Yes (5a only)	Yes	Yes	Yes

🔗 Visual Basic Code: Assignment Tracker & Subsystem Logger

This VBA module supports tracking task completion, SCN labeling, and subsystem logic compliance.

```
vb
' Module: N5_Engineering_Assignment_Tracker
' Purpose: Track task progress and subsystem logic for Leisure Pool Complex assignment

Option Explicit

Type AssignmentTask
    TaskNumber As Integer
    Title As String
    Marks As Integer
    Completed As Boolean
    SimulationRequired As Boolean
```

?

```
DesignRequired As Boolean
EvaluationRequired As Boolean
SCN As String
End Type

Dim tasks(1 To 5) As AssignmentTask

Sub InitializeTasks()
    tasks(1).Title = "Input Sensing Circuit"
    tasks(2).Title = "Flume Control System"
    tasks(3).Title = "Motorised Pool Cover"
    tasks(4).Title = "Hot Tub Logic Control"
    tasks(5).Title = "Pneumatic Pool Floor"

    Dim i As Integer
    For i = 1 To 5
        tasks(i).TaskNumber = i
        tasks(i).Marks = Choose(i, 11, 14, 9, 5, 11)
        tasks(i).SimulationRequired = (i = 2 Or i = 3 Or i = 4 Or i = 5)
        tasks(i).DesignRequired = True
        tasks(i).EvaluationRequired = True
        tasks(i).Completed = False
        tasks(i).SCN = ""
    Next i
End Sub

Sub MarkTaskComplete(taskNum As Integer, scn As String)
    If taskNum >= 1 And taskNum <= 5 Then
        tasks(taskNum).Completed = True
        tasks(taskNum).SCN = scn
        MsgBox "Marked Task " & taskNum & " (" & tasks(taskNum).Title & ") as complete." & vbCrLf & _
            "SCN: " & scn, vbInformation
    Else
        MsgBox "Invalid task number.", vbExclamation
    End If
End Sub

Sub DisplayAssignmentStatus()
    Dim i As Integer, output As String
    output = "📋 National 5 Engineering Assignment Status:" & vbCrLf
    For i = 1 To 5
        output = output & vbCrLf & "Task " & tasks(i).TaskNumber & ": " & tasks(i).Title & vbCrLf & _
            "Marks: " & tasks(i).Marks & vbCrLf & _
            "Simulation Required: " & IIf(tasks(i).SimulationRequired, "✔", "✗") & vbCrLf & _
            "Design Required: " & IIf(tasks(i).DesignRequired, "✔", "✗") & vbCrLf & _
            "Evaluation Required: " & IIf(tasks(i).EvaluationRequired, "✔", "✗") & vbCrLf & _
            "Status: " & IIf(tasks(i).Completed, "✔ Completed", "✗ Incomplete") & vbCrLf & _
            "SCN: " & IIf(tasks(i).SCN = "", "Not recorded", tasks(i).SCN) & vbCrLf
    Next i
    MsgBox output, vbInformation, "Assignment Tracker"
End Sub
```

Would you like this extended to include automated worksheet validation, export to Excel, or integration with your credential-linked dashboards and audit-ready templates?

Copilot said

Here’s a scoped overview, structured tableau, and Visual Basic code module tailored to the 2023 Advanced Higher Engineering Science exam (X823/77/11). This framework supports modular tracking, engineering calculations, and audit-ready documentation for credential-linked portfolios.

🧠 Overview: AH Engineering Science 2023 (X823/77/11)

Level	Advanced Higher
Subject	Engineering Science
Date	Tuesday, 16 May 2023
Duration	2 hours 30 minutes
Total Marks	75
Sections	Section 1 (35 marks), Section 2 (40 marks)
Resources Allowed	Data Booklet
Submission Format	Answer booklet + worksheets for Q1(a), Q8(a), Q8(e)

📁 Scope: Section Breakdown

🔑 Section 1 — Engineering Fundamentals

Q#	Topic	Skills Assessed	Marks
1	Project Planning	Network diagram, critical path, lifecycle phases	7
2	Power Systems	Transformer function, base load generation, wind turbine subsystems	6
3	Amplifier Design	Rc/Re selection, nodal analysis, power dissipation	5
4	Integrator Circuit	Vout expression, timing, capacitor effect	5

?

Q#	Topic	Skills Assessed	Marks
5	Solar Heating Efficiency	Energy conversion, heat transfer, system comparison	4
6	Castellated Beam	Geometry, second moment of area	4
7	Photobioreactor Tubes	Bending moment, span calculation	4

◆ Section 2 — Structural Analysis

Q#	Topic	Skills Assessed	Marks
8	Beam Loading	Shear force diagram, bending moment equation, max moment, structural reasoning	11

Tableau: Task Summary

Task Worksheet Required Calculation Type Diagram Required

Q1(a)	Yes	Network logic	Yes
Q3(a-c)	No	Electrical analysis	No
Q4(a-c)	No	Integrator timing	No
Q6(a-b)	No	Beam geometry	No
Q8(a,e)	Yes	Structural analysis	Yes



Visual Basic Code: Modular Tracker & Engineering Calculator

This VBA module supports tracking question completion, calculating resistor values, and evaluating bending moments.

```

vb
' Module: AH_EngScience2023_Tracker
' Purpose: Track question progress and support engineering calculations

Option Explicit

Type ExamQuestion
    Number As Integer
    Topic As String
    Marks As Integer
    Completed As Boolean
End Type

Dim questions(1 To 8) As ExamQuestion

Sub InitializeQuestions()
    Dim topics As Variant
    topics = Array("Project Planning", "Power Systems", "Amplifier Design", "Integrator Circuit", _
        "Solar Heating Efficiency", "Castellated Beam", "Photobioreactor Tubes", "Beam Loading")
    Dim marks As Variant
    marks = Array(7, 6, 5, 5, 4, 4, 4, 11)

    Dim i As Integer
    For i = 1 To 8
        questions(i).Number = i
        questions(i).Topic = topics(i - 1)
        questions(i).Marks = marks(i - 1)
        questions(i).Completed = False
    Next i
End Sub

Sub MarkQuestionComplete(qNum As Integer)
    If qNum >= 1 And qNum <= 8 Then
        questions(qNum).Completed = True
        MsgBox "Marked Question " & qNum & " (" & questions(qNum).Topic & ") as complete.", vbInformation
    Else
        MsgBox "Invalid question number.", vbExclamation
    End If
End Sub

Sub DisplayProgress()
    Dim i As Integer, output As String
    output = "AH Engineering Science 2023 Progress Tracker:" & vbCrLf
    For i = 1 To 8
        output = output & vbCrLf & "Q" & questions(i).Number & ": " & questions(i).Topic & vbCrLf & _
            "Marks: " & questions(i).Marks & vbCrLf & _
            "Status: " & If(questions(i).Completed, "✔ Completed", "✗ Incomplete") & vbCrLf
    Next i
    MsgBox output, vbInformation, "Exam Tracker"
End Sub

Function CalculatePowerDissipation(Vcc As Double, Ic As Double, Vout As Double) As Double
    ' P = Vce × Ic = (Vcc - Vout) × Ic
    CalculatePowerDissipation = (Vcc - Vout) * Ic
End Function

Function CalculateTimeToChangeVout(Vin As Double, R As Double, C As Double, deltaV As Double) As Double
    ' Vout = (Vin × t) / (RC) => t = (deltaV × R × C) / Vin
    CalculateTimeToChangeVout = (deltaV * R * C) / Vin

```

?

End Function
Would you like this extended to include graphical plotting (e.g. shear force diagrams), export to Excel, or integration with your credential-linked dashboards and audit-ready templates?

Copilot said

Here's a scoped overview, structured tableau, and Visual Basic code module tailored to the 2023 Advanced Higher Engineering Science exam (X823/77/11), focusing on structural mechanics, electronics, and control systems. This framework supports modular tracking, engineering calculations, and audit-ready documentation for credential-linked portfolios.

Overview: AH Engineering Science 2023 (X823/77/11)

Level	Advanced Higher
Subject	Engineering Science
Date	Tuesday, 16 May 2023
Duration	2 hours 30 minutes
Total Marks	75
Sections	Section 1 (35 marks), Section 2 (40 marks)
Resources Allowed	Data Booklet
Submission Format	Answer booklet + worksheets for Q1(a), Q8(a), Q8(e)

Scope: Key Topics by Question

Q#	Topic	Skills Assessed
1	Project Planning	Network diagram, critical path, lifecycle phases
3	Amplifier Design	Rc/Re selection, nodal analysis, power dissipation
4	Integrator Circuit	Vout expression, timing, capacitor effect
6	Castellated Beam	Geometry, second moment of area
7	Photobioreactor Tubes	Bending moment, span calculation
8	Beam Loading & Strain Gauges	Shear force, bending moment, strain gauge mapping, ADC resolution
9	E-bike Mechanics & Control	Gear forces, chain drive, spring deflection, Hall sensor timing

Tableau: Engineering Data Summary

Castellated Beam Ix-x Table

Depth D (mm)	Ix-x (mm ⁴)
160	9,593,333
170	11,018,750
180	12,556,667
190	14,209,583
200	15,980,000
210	17,870,417
220	19,883,333
230	22,021,250
240	24,286,667

Photobioreactor Tube

- Outer diameter: 54 mm
- Second moment of area: $101 \times 103 \text{ mm}^4 \times 10^3$
- Ultimate tensile stress: 7.2 N/mm²
- Ultimate compressive stress: 995 N/mm²
- Factor of safety: 3

Visual Basic Code: Structural & Control Calculators

This VBA module supports bending moment calculations, ADC resolution, and gear force analysis.

```
vb
' Module: AH_EngScience2023_Calculators
' Purpose: Support structural and control system calculations for Q7-Q9

Option Explicit

' Calculate maximum permissible bending moment
Function MaxBendingMoment(stress As Double, Ixx As Double, y As Double, safetyFactor As Double) As Double
    ' M = (σ × I) / y × (1 / safetyFactor)
    MaxBendingMoment = (stress * Ixx / y) / safetyFactor
End Function

' Calculate span from bending moment
Function MaxSpan(M As Double, w As Double) As Double
    ' M = (w × L2) / 8 → L = sqrt(8M / w)
    MaxSpan = Sqr((8 * M) / w)
End Function
```

?

```
' Calculate ADC resolution and digital value
Function ADCResolution(bits As Integer, peakVoltage As Double) As Double
    ADCResolution = (peakVoltage * 1000) / (2 ^ bits)
End Function

Function ADCValue(inputVoltage As Double, peakVoltage As Double, bits As Integer) As Integer
    ADCValue = Int((inputVoltage / peakVoltage) * (2 ^ bits - 1))
End Function

' Calculate tangential and radial gear forces
Function GearForces(powerWatts As Double, rpm As Double, radius_mm As Double, pressureAngle_deg As Double) As String
    Dim omega As Double, torque As Double, Ft As Double, Fr As Double
    omega = (2 * WorksheetFunction.Pi() * rpm) / 60
    torque = powerWatts / omega
    Ft = torque / (radius_mm / 1000)
    Fr = Ft * Tan(pressureAngle_deg * WorksheetFunction.Pi() / 180)
    GearForces = "Tangential: " & Format(Ft, "0.00") & " N, Radial: " & Format(Fr, "0.00") & " N"
End Function
```

Related tags: [Turn Your Holiday Blues Into Real Love](#) [assessment](#) [Personal](#) [Quality assurance](#) [2017 - Awarding Procedures](#) [Awarding Meetings](#) [Course Assessment](#) [SCQF 5](#) [QA](#)

USER INTERESTS

ft [fiston tshingombe](#)

?